



Trimble Navigation Limited
935 Stewart Drive
Sunnyvale, CA 94085

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VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: FCC File No. SAT-MOD-20101118-00239; IB Docket No. 11-109

Dear Secretary Dortch:

Trimble Navigation Limited (“Trimble”) hereby submits this letter and the enclosed Appendix to ensure the completeness and accuracy of the Federal Communications Commission (“FCC” or “Commission”) record in the above-referenced proceedings involving LightSquared Subsidiary LLC and its subsidiaries and affiliates.^{1/} Specifically, clarification of the historical context surrounding LightSquared’s authorization and its proposal to build a nationwide, terrestrial broadband wireless network appears necessary, particularly in light of recent congressional testimony by members of the Commission’s staff (referred to herein as the “FCC witnesses”).^{2/}

In their testimony, the FCC witnesses suggested that the GPS industry had numerous opportunities in over a “decade” of proceedings to raise concerns that ubiquitous high-powered terrestrial use of the Mobile Satellite Service (“MSS”) spectrum licensed to LightSquared’s predecessors to provide satellite service would cause “overload” interference to many GPS receivers, and failed to do so.^{3/} As explained below, this suggestion does not accurately reflect the substantial differences between the fully integrated “ancillary” terrestrial use of the MSS bands at issue in those proceedings and the nationwide, free-standing terrestrial service proposed by LightSquared for the L-Band in November 2010.

The FCC witnesses further suggested that the FCC has historically looked to the private GPS industry to raise such interference issues. This suggestion grossly understates the long-standing role of the FCC, in coordination with NTIA and other government agencies, in regulating and managing the GPS spectrum, which is first and foremost a government spectrum use.

^{1/} Unless otherwise noted, LightSquared Subsidiary LLC and its subsidiaries and predecessors are referred to herein individually and collectively as “LightSquared.”

^{2/} *The LightSquared Network: An Investigation of the FCC’s Role: Hearing Before the House Oversight and Investigations Subcomm. of the Energy and Commerce Comm.*, 112th Cong. (Sept. 21, 2012) (joint written statement of Julius P. Knapp, Chief, Office of Engineering and Technology, FCC, and Mindel De La Torre, Chief, International Bureau, FCC) (“Sept. 2012 Knapp/De La Torre Testimony”). A similar version of the Appendix was submitted by Trimble to the United States House of Representative’s Energy and Commerce Committee on August 31, 2012.

^{3/} See *id.* at 2.

Discussion

The Federal Government Has Consistently Recognized the Importance of GPS, and NTIA Has Always Taken an Active Role in Protecting Its Use

From its inception in the late 1970s, the GPS satellite constellation has been operated using spectrum expressly allocated domestically and internationally for the Radio Navigation Satellite Service. Public investment in the constellation of GPS satellites created and maintained by the Department of Defense has totaled over \$35 billion. The GPS constellation was originally intended primarily for military use, but was subsequently opened to full commercial use.

The critical nature of GPS has been recognized in no fewer than three presidential directives, adopted in both Republican and Democratic administrations.^{4/} As such, Federal government users are and have been the primary party-in-interest in preserving and enhancing the use of GPS. A remarkable variety of Federal government departments and agencies use GPS to manage a wide array of critical government functions, from aviation safety and training our nation's troops, to tracking government assets purchased with taxpayer dollars, to climate analysis and early warning of storms and other natural disasters, to name just a few. As with other Federal government spectrum uses, NTIA has been entrusted with representing the interests of affected Federal agencies when changes in spectrum use, such as the proposal to allow additional terrestrial use of MSS spectrum, are considered by the FCC. Consequently, NTIA extensively analyzed and commented on the potential for interference to GPS and other services from the outset of the FCC's consideration of terrestrial use of MSS spectrum.^{5/}

The FCC Historically Committed to Protect GPS and Never Authorized – and in Fact, Flatly Prohibited – Ubiquitous, Stand-Alone Terrestrial Services in the MSS Spectrum

Consistent with the government's responsibility for safeguarding GPS, the record demonstrates that the FCC was cognizant of the risks of interference to GPS that might result from terrestrial operations in the MSS band, and had explicitly committed to actively working with interested government parties to avoid *any form* of harmful interference to GPS.^{6/} This historic commitment broke down when the Commission was presented with LightSquared's proposal to use the L-Band to provide 4G broadband wireless services nationwide. Ultimately, that proposal was shown to be technically infeasible because of the harmful interference it would have presented to the entire GPS network, including government as well as private sector users and providers. There is no justification, however, for the FCC witnesses' claim that the "GPS

^{4/} See White House, National Security Decision Directive Number 102, *U.S. Response to Soviet Destruction of KAL Airliner*, Sep. 5, 1983, available at <http://www.fas.org/irp/offdocs/nsdd/nsdd-102.htm>; White House, National Security Decision Directive Number 6, *U.S. Global Positioning System Policy*, March 28, 1996, available at <http://www.fas.org/spp/military/docops/national/gps.htm>; White House, Presidential Policy Directive Number 4, *National Space Policy of the United States of America*, June 28, 2010, available at http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf.

^{5/} See Appendix at 5-6; see also *id.* at 24-25.

^{6/} See *id.* at 12-13.

industry” was somehow to blame for the FCC’s false start in this proceeding and the highly foreseeable final result.

Review of the record of the FCC’s prior consideration of proposed terrestrial use of the mobile satellite band adjacent to GPS, as set forth in detail in the attached Appendix, establishes five critical facts unacknowledged by the FCC witnesses:

- (1) LightSquared’s predecessors, dating back to 2001, proposed strictly limited terrestrial operations to “fill in the gaps” in a nationwide satellite service footprint where such limited terrestrial operations would be fully integrated with and in support of the primary *satellite service*;^{7/}
- (2) all parties to the proceedings evaluating potential terrestrial use of the satellite spectrum, both government and industry, premised their analyses and comments on the specific content of these proposals discussing only limited, supplementary terrestrial operations, not the as yet unknown nationwide terrestrial network proposed by LightSquared in 2010;^{8/}
- (3) the FCC made clear, repeatedly and consistently, that terrestrial operations were permitted for limited “fill in” purposes only, and that sale of terrestrial-only services to the mass mobile market (as proposed by LightSquared in 2010) was flatly and unambiguously prohibited;^{9/}
- (4) the FCC imposed a series of stringent interference restrictions on these limited terrestrial operations that directly and indirectly protected GPS from interference of any kind, including the widespread overload interference that would have resulted from approval of LightSquared’s 2010 proposal;^{10/} and
- (5) the FCC did not, until 2010, initiate a rulemaking or other proceeding that solicited comment on proposals to make ubiquitous terrestrial use of MSS spectrum, and even then did not propose to modify fundamental pre-existing limitations on such uses that protected GPS, instead electing to conditionally waive them in the January 2011 International Bureau decision.^{11/}

Before 2010, NTIA and Other Affected Parties Had No Cause to Raise Concerns Regarding “Overload” Interference to GPS Devices Given the Strictly Limited Nature of the Authorized Terrestrial Operations

When read in the light of what the FCC actually said and did prior to 2010, the suggestion of the FCC witnesses that the GPS industry should have raised overload interference issues in the prior

^{7/} See *id.* at 1-4, 14.

^{8/} See *id.* at 4-6, 15.

^{9/} See *id.* at 6-13.

^{10/} See *id.*

^{11/} See *id.* at 19, 26-27.

“decade” and is at fault for failing to do so is entirely unsupported. The GPS industry and, more importantly, government users relied on the FCC’s unequivocal statements that terrestrial operations would be strictly limited, and therefore focused their attention on what they believed to be the main interference issue – the possibility that terrestrial transmitters would generate emissions directly in the GPS band.^{12/}

NTIA made this abundantly clear in January 2011 when it formally raised interference concerns with LightSquared’s 2010 proposal on behalf of government users.^{13/} In that letter, NTIA warned that LightSquared’s proposal “raises significant interference concerns that warrant full evaluation . . . to ensure that LightSquared services do not adversely impact Global Positioning System (GPS) and Global Navigation Satellite System (GNSS) receivers, maritime and aeronautical emergency communication systems, and Inmarsat receivers used by the Federal agencies.”^{14/} NTIA stated that it “recognized in 2002 that facilitating the introduction of ATC

^{12/} See *id.* at 15-16, 20-21.

^{13/} See *id.* at 24. The fact that NTIA felt compelled to send a formal, publicly released letter to the FCC raising these concerns suggests that the FCC failed to engage in detailed consultation with government users prior to putting LightSquared’s November 2010 proposal out for public comment, notwithstanding its prior commitments to do so. See *id.* at 8-10, 12, 17. This is also clear from a separate letter sent to the FCC by the Department of Defense (“DoD”) in January 2011. The DoD’s letter similarly expressed concern that LightSquared’s stand-alone terrestrial network could cause harmful interference to DoD’s critical operations and suggested that the International Bureau had not conducted the proper interference analysis or mitigation studies before proposing to conditionally approve LightSquared’s operations. See *id.* at 24-25. Even after the FCC announced in January 2011 that a working group would be established to evaluate the potential of harmful interference to GPS reception from LightSquared’s proposed operations, government users remained concerned that they were not provided with an effective role in that process. See, e.g., *id.* at 27 (discussing a joint letter submitted by the DoD and the Department of Transportation (“DOT”), stating that “DoD and DOT were not sufficiently included in the development of the LightSquared initial work plan and its key milestones” and expressing concern with the “lack of inclusiveness regarding input from federal stakeholders”).

The FCC witnesses also implied that decisions by the Commission in 2010 approving certain modifications to the MSS license in question and approving the transfer of control of the licensee to new owners constituted endorsement of LightSquared’s subsequently announced plan to use its MSS spectrum to provide nationwide, terrestrial-only services to the mobile mass market. While an appendix to the FCC witnesses’ testimony states that the FCC “coordinate[d]” the modification order with “relevant” Executive Branch agencies, see Sept. 2012 Knapp/De La Torre Testimony at Appendix at 3, there is no evidence that the FCC gave NTIA or government GPS users notice of LightSquared’s plans to use its MSS spectrum to provide terrestrial-only services or deploy a high-powered nationwide network using MSS spectrum prior to the March 2010 transfer and license modification orders, if in fact the FCC knew of these plans at the time. As set forth in the attached Appendix, at the same time it released these two orders, the Commission released the National Broadband Plan, which specifically reiterated that terrestrial MSS operations were restricted to fill-in purposes and called for further proceedings to consider expanded terrestrial use. See Appendix at 17. It is also noteworthy that the text of the FCC’s condition requiring LightSquared to deploy nationwide services specifically states that LightSquared could satisfy this requirement using any of its available spectrum, and LightSquared had previously represented to the Commission that it had both MSS and substantial *non*-MSS spectrum available to it. See *id.* at 17-18.

^{14/} Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dep’t of Commerce, to Mr. Julius Genachowski, Chairman, FCC, IBFS File No. SAT-MOD-20101118-00239, at 1 (filed Jan. 12, 2011).

services in spectrum used for MSS could lead to an attendant increase in interference to GPS receivers, such as Enhanced-911 (E-911) capable handsets and consumer navigation and location devices. However, given the expected limited deployment of ATC base stations at that time under the FCC's orders granting ATC authority, NTIA believed that the FCC could address the potential interference to GPS receivers by establishing limits on emissions in the GPS frequency bands."^{15/}

NTIA also explained why government users, as well as industry, did not specifically address overload interference in prior proceedings. It observed that "the Federal and non-Federal GPS users and GPS manufacturers thought this [overload interference] problem was manageable under the original MSS/ATC concept where there would be a limited number of terrestrial base stations transmitting at a low duty cycle to fill gaps in MSS coverage. . . . [A]s the number of terrestrial base stations increases and/or the duty cycle of base stations transmissions increases to support the proposed LightSquared terrestrial network, NTIA is concerned that the likelihood of GPS and GNSS receiver in-band interference will also increase."^{16/}

A former government official with extensive involvement in the original consideration of proposals for terrestrial use of MSS spectrum confirmed this historical understanding based on his observation of the governmental consultations at the time. At a House hearing on February 8, 2012 regarding the LightSquared proceeding, Dr. Scott Pace stated that "[w]hen this originally started back in about 2003, the idea of an ancillary terrestrial component to mobile satellite service was considered a kind of a fill-in, a gap-filler, a relatively low-power system. No one was talking about 40,000 high-powered cell towers blanketing the country. Nobody was talking about having an independent terrestrial service separate from the satellite services. The FCC was very clear over the years that they would not allow a separate, standalone, service, that, in fact, it always had to be tied to the satellite service, and no interference with the satellite service would occur."^{17/}

In Congressional testimony last summer, General William L. Shelton, Commander of Air Force Space Command, which is responsible for operating the GPS satellite constellation and managing military uses of GPS, also confirmed Federal users' understanding that the primary satellite services authorized in the MSS band were part of a "quiet" spectrum neighborhood, and explained why this was important:

[T]he frequency band that we're talking about here has, by FCC rulings in the past, [] always been intended to be a, quote, unquote, 'quiet neighborhood'; that GPS could coexist with other signals of the same magnitude. GPS is a very weak signal coming from space. It's a spread spectrum signal. It takes very special processing by receivers to pull that signal out of the background noise. If you have signals of a similar strength to

^{15/} *Id.* at 2.

^{16/} *Id.* at 2-4.

^{17/} *A Review of Issues Associated with Protecting and Improving Our Nation's Aviation Satellite-Based Global Positioning System Infrastructure: Hearing Before the Subcomm. on Aviation of the Comm. on Transportation and Infrastructure, 112th Cong. at 25 (Feb. 8, 2012) (testimony of Dr. Scott Pace, Director, Space Policy Institute, Elliott School of International Affairs, The George Washington University); see also Appendix at 9-10.*

GPS, that's not a problem for the receiver. However, if you put a rock band in the middle of that very quiet neighborhood, it's a very different sort of circumstance.^{18/}

The fact that overload interference issues were not raised, and were considered “manageable” by the affected parties, is also understandable given the panoply of interference protections imposed by the Commission, which directly and indirectly limited the risks of overload interference to GPS. In particular, the potential for various kinds of damaging interference effects from terrestrial operations in the L-Band were clearly raised and considered in 2003 and in subsequent orders, and were resolved in a manner that also protected GPS.^{19/} One such protection was a specific rule adopted in 2003 that directly obligated *MSS licensees* to resolve any interference resulting from their terrestrial operations.^{20/}

One of the main interference threats addressed by the FCC was direct “in band” interference with the authorized providers of mobile satellite services in the L-Band, including LightSquared’s predecessor MSV and Inmarsat. “In band” interference involves interference to like services in the same frequency band. NTIA provided extensive analyses and recommendations regarding this issue.^{21/} In response, the FCC adopted detailed limitations on MSV’s terrestrial operations to minimize the risks of such interference.^{22/} In addition, because the primary purpose of MSV’s MSS authorization was to permit it to provide satellite service, MSV acknowledged, and the FCC relied upon, MSV’s need to manage its terrestrial operations to avoid interference to its own satellite service.^{23/}

These mandatory and practical limitations on terrestrial operations also reduced the potential for interference to the GPS frequency band, even though it is adjacent to the MSS band. Restrictions that reduced interfering “in-band” transmissions necessarily reduced the impact on GPS uses in the next band over, and to an even greater extent, because the extent of “overload” interference in an adjacent band is a function of proximity in the spectrum band as well as other variables such as the power level of the interfering transmissions.^{24/}

^{18/} *Sustaining GPS for National Security: Hearing Before the Subcomm. on Strategic Forces of the H. Comm. on Armed Services*, 112th Cong. at *10 (Sept. 15, 2011) (oral testimony of General William L. Shelton, Commander, Air Force Space Command), *available at* http://findarticles.com/p/news-articles/political-transcript-wire/mi_8167/is_20110916/rep-michael-turner-holds-hearing/ai_n58165676/; *see also* Appendix at 10.

^{19/} *See, e.g., id.* at 6-10, 12-13, 17-18.

^{20/} 47 C.F.R. § 25.255 (“If harmful interference is caused to other services by ancillary MSS ATC operations, either from ATC base stations or mobile terminals, the MSS ATC operator must resolve any such interference.”); *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962, ¶ 104 (2003) (“2003 Order”); *see also* Appendix at 8.

^{21/} *See, e.g., id.* at 5-6.

^{22/} *See, e.g., id.* at 6-10, 12-13, 17-18.

^{23/} *See, e.g., id.* at 4, 6-10.

^{24/} The FCC witnesses suggested that the FCC decision in 2005 to remove specific numerical restrictions on the number of terrestrial fixed transmitters granted “authority to deploy an unlimited number of terrestrial base stations,” implying that this authorized the dramatic expansion of terrestrial operations proposed by LightSquared in 2010, and further implying that interested parties should have

The FCC witnesses provided none of this critical context nor did they acknowledge that the terrestrial proposals the FCC considered and the terrestrial uses the FCC permitted prior to 2010 were fundamentally different from what LightSquared proposed in 2010. There are orders of magnitude of difference between strictly regulated terrestrial operations sufficient solely to fill in gaps in a satellite service on one hand, and a nationwide, mass market, terrestrial-only mobile broadband service with 40,000 high-power base stations blanketing 90 percent of the U.S. population on the other. In the same way, there are orders of magnitude of difference between the “manageable” overload interference issue (in the words of NTIA) presented by the former, and the virtual nationwide blackout of GPS that would have resulted had LightSquared been allowed to proceed with its original proposal to deploy high-powered facilities using the MSS spectrum immediately adjacent to GPS (commonly referred to as the “upper L-Band”).

Suggestions That GPS Receivers Inappropriately “Listen In” to Other Spectrum Bands and Lack Adequate Filters Mischaracterize and Prejudge Complex Technical Issues Currently Pending Before the Commission

The FCC witnesses also suggested that GPS receivers “listen in” to other spectrum bands and that this characteristic is the source of the GPS interference problem. The FCC witnesses also stated that the overload interference issue results from “unfiltered or poorly filtered” GPS devices.^{25/} These statements fundamentally mischaracterize the overload interference issue and appear to reflect a prejudgment of complex technical issues that remain pending before the Commission.

As an initial matter, the concept of a receiver “listening in” to another band is meaningless from a technical standpoint. Cases of “overload” interference often involve disruption of receivers by transmissions outside the frequency band the receiver is designed to receive, yet the FCC routinely considers and seeks to prevent such interference in appropriate circumstances.^{26/} The

recognized this in 2005. *See* Sept. 2012 Knapp/De La Torre Testimony at 8. However, these statements are not supported by the FCC orders. As set forth in the attached Appendix, the 2003 Order established specific restrictions on the number of permitted terrestrial transmitters operating in the L-Band in order to protect Inmarsat, the other MSS operator in the band. While the Commission removed these specific numerical restrictions in 2005, it made clear that this change was not intended to increase the overall level of permitted interference. Rather, elimination of the numerical limit was a change made to accommodate the MSS licensee’s deployment of a “fill-in” terrestrial network to cover the specific gaps in satellite coverage – but without increasing the overall “interference budget.” *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Memorandum Opinion and Order and Order and Second Order on Reconsideration, 20 FCC Rcd 4616, ¶ 47 (2005); *see also* Appendix at 6-10, 12-13. In such a fill-in network, the number of contemplated low-power cells covering the insides of individual buildings and homes could easily grow into the “tens of thousands” with even a modest customer base, exceeding the numerical limits. *See* Sept. 2012 Knapp/De La Torre Testimony at 7. Nothing in this decision to eliminate the numerical limits, however, suggested that LightSquared’s predecessors were authorized to build a nationwide network of 40,000 high-powered base stations.

^{25/} *See* Sept. 2012 Knapp/De La Torre Testimony at 4.

^{26/} *See, e.g., Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band; Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, Report and Order and Second Report and

FCC witnesses' simplified view of the Commission's spectrum management responsibilities is particularly unwarranted in the case of GPS, which is not a traditional communications service.

As extensively demonstrated in the LightSquared docket, and as noted in General Shelton's testimony above, GPS receivers are built to pick up very faint GPS signals transmitted from satellites 12,000 miles away, extract these signals from significant background "noise," and process the signals to produce accurate timing and location information. As a result, they are inherently vulnerable to high-powered transmissions in closely adjacent spectrum. In some cases, this vulnerability can be reduced by using "filters" to provide greater resistance to adjacent signals, but the overall effectiveness of filtering across the full range of critical GPS uses is in question based on the technical information in the record before the Commission.

For example, there is no evidence in the record that any kind of filtering could prevent overload interference from high-powered operations in the upper L-Band, and even LightSquared essentially conceded this by recently offering to rescind its authorization to operate in this part of the L-Band.^{27/} Filtering also involves complex design and performance tradeoffs, none of which have been considered or addressed in any FCC order.^{28/} Consequently, the FCC witnesses' categorical statement that overload interference is the result of "poor" filtering both oversimplifies and prejudices the complex technical issues currently under consideration by the FCC.^{29/}

The historical design of GPS receivers also must be understood in the context of the limited terrestrial operations authorized by the FCC prior to 2010, which are described above. Since LightSquared's predecessors never deployed even these limited terrestrial facilities, there was no real world experience with terrestrial frequency use. For the FCC witnesses to suggest now that

Order, 25 FCC Rcd 11710 (2010) (evaluating the potential for overload interference to Satellite Digital Audio Radio Service receivers from Wireless Communications Service ("WCS") mobile devices and adopting conditions on WCS devices to help mitigate the potential for such interference); *Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band*, Notice of Proposed Rulemaking, 22 FCC Rcd 17035, ¶ 16 (2007) (expressing concern with overload interference to adjacent channel mobile receivers from AWS-3 operations and proposing to limit the transmitting power of the AWS-3 mobile transmissions to protect such receivers).

^{27/} See IBFS File No. SAT-MOD-20120928-00161 (filed Sept. 28, 2012).

^{28/} See, e.g., Reply Comments of the Coalition to Save Our GPS, Docket Nos. 11-109 & 10-142, File No. SAT-MOD-20101118-00239, at 29-30 (filed March 30, 2012) ("Coalition Reply Comments"); Coalition to Save Our GPS Opposition to LightSquared Petition for Declaratory Ruling, Docket Nos. 11-109 & 10-142, at 31-36 (filed Feb. 27, 2012) ("Coalition Opposition"); Letter from Catherine Wang and Tim Bransford, Bingham McCutchen LLP, on behalf of Deere & Company, Garmin International, Inc., and Trimble Navigation Limited, to Marlene H. Dortch, Secretary, FCC, Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239 (filed Oct. 27, 2011).

^{29/} These statements also ignore extensive record evidence that many high precision GPS receivers are *intentionally* designed to receive signals in the MSS band, specifically in order to receive augmentation signals from LightSquared itself pursuant to contractual obligations imposed by LightSquared. See, e.g., Coalition Reply Comments at 17-20; Coalition Opposition at 24; Reply Comments of the Coalition to Save Our GPS, Docket Nos. 11-109 & 10-142, at 12-13 (filed March 13, 2012).

GPS receivers should have been designed to withstand ubiquitous, high-powered terrestrial transmissions in the MSS band is hindsight of a highly selective and pernicious variety.

* * *

As demonstrated by the foregoing and the attached Appendix, the FCC witnesses' account of the LightSquared proceedings does not withstand scrutiny. The contemporaneous statements of LightSquared's predecessors, the statements of the government GPS users with the primary stake in the continued robust functioning of GPS, and the Commission's own statements in its prior decisions, as detailed in the attached Appendix, make clear that the terrestrial uses that the Commission previously contemplated and authorized were nothing like what LightSquared proposed in 2010 and the FCC's International Bureau authorized by conditional waiver in January 2011.

Against all of this contemporaneous evidence, the FCC's decisions in the "decade" leading up to 2010 do not contain any statements remotely suggesting that LightSquared's predecessors were authorized to build a nationwide terrestrial network using MSS spectrum. It is therefore not surprising that no one objected until such a proposal was made clearly and explicitly. In the face of overwhelming evidence of the interference risk posed by LightSquared's proposal, the Commission has now tentatively concluded to vacate the conditional waiver granted to LightSquared in January 2011 and suspend indefinitely LightSquared's terrestrial authority.^{30/} Trimble respectfully requests that the Commission adopt these tentative conclusions without delay.

Respectfully submitted,



James A. Kirkland
Vice President and General Counsel

Attachment

^{30/} See *International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver*, Public Notice, 27 FCC Rcd 1596 (2012); see also Appendix at 29.

APPENDIX

HISTORY OF THE LIGHTSQUARED PROCEEDING

The following provides a detailed chronology of the proceedings involving LightSquared Subsidiary LLC and its subsidiaries and predecessors^{1/} and the potential for LightSquared's proposed high-powered, nationwide terrestrial network to cause overload interference to Global Positioning System ("GPS") devices. Review of the record reveals that LightSquared's predecessors proposed, and the Federal Communications Commission ("FCC" or "Commission") authorized, limited "fill in" terrestrial operations, and that the potential for interference to GPS and other services was evaluated by government and private stakeholders on this basis. Moreover, LightSquared's predecessors expressly disclaimed any intention to offer a terrestrial-only service using Mobile Satellite Service ("MSS") spectrum, and the FCC adopted clear policies prohibiting such services. It was not until July 2010 that the Commission initiated a rulemaking proceeding involving rule and policy changes that would have, *inter alia*, substantially increased terrestrial use of the L-Band. On November 18, 2010, LightSquared followed this with an "update" to its business plan proposing ubiquitous terrestrial operations using its MSS spectrum, and for the first time, freestanding terrestrial services. In both cases, the GPS community, including Trimble Navigation Limited ("Trimble"), promptly raised the overload interference issue with the relevant Federal entities.

I. THE FCC CONSIDERS AUTHORIZING LIMITED, "ANCILLARY" TERRESTRIAL OPERATIONS IN THE MOBILE SATELLITE SERVICE (2001 – 2003)

The FCC license granted to LightSquared's predecessor American Mobile Satellite Corporation in 1989 authorized satellite-only operations in the L-Band, consistent with domestic and international spectrum allocations.^{2/} As detailed below, in 2001, LightSquared's predecessors Motient Services Inc. ("Motient") and Mobile Satellite Ventures Subsidiary LLC ("MSV") and others proposed adding a supplemental "ancillary" terrestrial use designed to "fill in the gaps" in the satellite-based coverage that the primary MSS would provide.

The detailed timeline below for this period shows that all parties, including LightSquared, were well aware of the need for limitations on terrestrial use of L-Band spectrum in order to protect GPS. For instance, when the Commission considered providing MSS operators with Ancillary Terrestrial Component ("ATC") authority, Motient and MSV asserted to the Commission their understanding that any terrestrial operations that may be authorized would need to be ancillary to, and not separate from, the underlying satellite service, as they would not

^{1/} Unless otherwise noted, LightSquared Subsidiary LLC and its subsidiaries and predecessors are referred to herein individually and collectively as "LightSquared."

^{2/} *Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services, et al.*, Memorandum Order and Authorization, 4 FCC Rcd 6041 (1989) (granting LightSquared's predecessor American Mobile Satellite Corporation a satellite license in the L-Band).

be permitted to operate in a manner that would cause harmful interference to GPS receivers. They also specifically recognized their obligation to protect GPS devices and reassured the Commission that they would uphold this commitment.

Detailed Timeline

March 1, 2001 – LightSquared’s predecessors Motient and MSV file an application seeking ATC authority to supplement their satellite authorizations, noting the intended “fill in” nature of the terrestrial operations.

- Motient and MSV file an application requesting ATC authority to integrate terrestrial components into their MSS networks to augment, not replace, the underlying satellite service. This request was made in the context of an application seeking to combine the satellite systems of Motient and TMI Communications and Company, Limited Partnership (“TMI”) into a jointly-owned subsidiary, MSV.^{3/} The parties explain that “[t]he proposed system will use a highly innovative and spectrum-efficient combination of spot-beam satellites and fill-in terrestrial base stations to substantially improve coverage, capacity, and reliability, without using any additional spectrum. The Commission’s grant of this proposal will clear the path to a revitalized regional MSS system that will provide competitive, high-speed, and affordable communications services to the most rural and remote areas.”^{4/}
- They further add that “[t]he next-generation system will employ two high-power, spot-beam geostationary satellites. Integrated with these satellites will be fill-in base stations in high-traffic areas to enable the co-channel reuse of the satellite service link frequencies, providing coverage to areas blocked from the satellite signal. . . . [T]he companies arrived at this proposal to transition from the current system to one built on satellite technology and supplemented by terrestrial base stations, with the coverage and capacity to provide an affordable service.”^{5/}

March 19, 2001 – The Commission issues a Public Notice seeking comment on Motient and MSV’s application requesting ATC authority to supplement existing satellite operations.

- The Commission explains that the application “includes a request to deploy terrestrial base stations in the 1626.5-1660.5/1525-1559 MHz bands, to be used with user terminals in high-traffic areas and where the satellite signal is blocked.”^{6/}

^{3/} See IBFS File No. SAT-ASG-20010302-00017 (filed March 1, 2001).

^{4/} *Id.* at i.

^{5/} *Id.* at ii-iii.

^{6/} *International Bureau Sets Deadlines Concerning Motient/TMI Assignment and Transfer of Control Applications, and Motient’s Request for Second Generation Satellite/Terrestrial Base Station System; Deadline Extended for TMI’s Applications to Assign Earth Stations*, Public Notice, Report No. SAT-00066, at 1-2 (rel. March 19, 2001).

May 7, 2001 – Motient, MSV, and TMI file a Consolidated Opposition to Petitions to Deny the application, explaining that the terrestrial operations will be supplemental and not stand-alone and will protect GPS.

- Motient, MSV, and TMI explain that the proposed system will provide “a nationwide satellite-based service” and “integrated, ancillary, in-band terrestrial facilities that operate strictly on a noninterference basis to improve coverage in urban areas.” They note that unlike terrestrial-only systems, “all of the frequencies will be used by the satellites, all of the mobile terminals will be capable of operating with the satellites, and none of the terrestrial facilities will detract in any way from maximum use of the satellites.”^{7/}
- Further, Motient, MSV, and TMI confirm that the “terrestrial operations will not cause harmful interference to GPS receivers.”^{8/}

August 17, 2001 – The Commission issues a Notice of Proposed Rulemaking (“NPRM”) seeking comment on proposals from Motient and others to add supplemental ATC authorizations to existing satellite authorizations and noting the need to protect GPS from ATC operations.

- The Commission seeks comment on proposals from Motient and others to integrate supplemental terrestrial operations to augment the underlying satellite service. The Commission confirms that the proposed terrestrial use would be fully integrated with the satellite operations and that the terrestrial operations would be a “gap-filler” service:

Motient seeks authority to operate terrestrial base stations, as part of Motient’s next-generation mobile satellite system in both the upper and lower L-band. The terrestrial base stations would be integrated with the satellite network and would enable co-channel reuse of the satellite service link frequencies in adjacent satellite antenna beams to provide coverage to areas where the satellite signal is attenuated by foliage or terrain and to provide in-building coverage. The satellite path would be the preferred communications link, but if the user’s satellite path is blocked, the communications link would be sustained via the fill-in base stations.^{9/}

- The Commission notes that the “L-band MSS satellite transmitters operate [in] the lower adjacent band to the Global Positioning System (‘GPS’) and other Radio Navigation Satellite Services [(‘RNSS’)]. Unwanted emissions from terrestrial stations in the MSS will have to be carefully controlled in order to avoid interfering with GPS receivers.”^{10/}

^{7/} Consolidated Opposition to Petitions to Deny and Reply to Comments of Motient, MSV, and TMI, IBFS File Nos. SAT-ASG-20010302-00017 and SES-ASG-20010116-00099, at ii-iii, 13 (filed May 7, 2001).

^{8/} *Id.* at 15.

^{9/} *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band*, Notice of Proposed Rulemaking, 16 FCC Rcd 15532, ¶ 15 (2001).

^{10/} *Id.* ¶ 68.

- The Commission recognizes that requiring the permitted terrestrial operations to remain “strictly ancillary” to the underlying satellite operations is critical in preventing the interference problems that may be caused by the service.^{11/}

October 22, 2001 – Motient, MSV, and TMI submit comments on the FCC’s NPRM, confirming that they will not operate stand-alone terrestrial services and will not interfere with GPS.

- Motient, MSV, and TMI confirm that they “will not operate a terrestrial-only system; rather, terrestrial operations will only supplement the satellite service in urban and indoor environments with terrestrial extensions.”^{12/}
- They acknowledge that existing technical rules are designed to protect GPS and recognize that they have an obligation to protect GPS, stating that “MSV has every incentive to ensure that its terrestrial base station operations do not interfere with GPS receivers.”^{13/} They also assert that GPS is protected due to MSV’s self-interest in protecting its own satellite signals.^{14/}

January 10, 2002 – LightSquared’s predecessor Motient files for bankruptcy.

July 17, 2002 – The U.S. GPS Industry Council (“USGIC”) and LightSquared’s predecessor, MSV, submit a letter to the FCC indicating that they have, after good faith consultation, reached an agreement on out-of-band emissions (“OOBE”) limits, which are expressly tied to the limited “fill-in” plans supplementing MSV’s satellite network. In fact, the joint cover letter describing the agreed upon resolution expressly notes that this was based upon the limited terrestrial deployment that MSV had proposed, and that a different approach would have been required for larger scale deployment.

- The parties explain that “[t]hese OOBE limits are appropriate considering that MSS services, technical characteristics, operational interference scenarios, and expected density are published and understood. MSV’s proposed terrestrial augmentations are also well known. *Consequently, these OOBE limits developed for the MSV service are unlike the OOBE limits required to address emerging novel communication techniques with . . . deployment in large-scale, overlapping networks.*”^{15/}

^{11/} *Id.* ¶ 78 (“We also seek comment on whether these rule changes sufficiently prevent interference problems and whether they adequately ensure that terrestrial operations remain strictly ancillary.”).

^{12/} Comments of Motient Services Inc., TMI Communications and Company, Limited Partnership, and Mobile Satellite Ventures Subsidiary LLC, IB Docket No. 01-185 and ET Docket No. 95-18, at 23 (filed Oct. 22, 2001).

^{13/} *Id.* at 27.

^{14/} *See id.* at 17 (“Because MSV’s own satellite system will be the most affected by signals generated by ancillary terrestrial operations, it will have every incentive to monitor and minimize these signal levels in order to ensure that the quality of its satellite service is not compromised.”).

^{15/} Letter from Bruce D. Jacobs, Shaw Pittman, L.L.P., Counsel for MSV, and Raul R. Rodriguez, Leventhal, Senter & Lerman PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-ASG-20010302-00017, at 1 (filed July 17, 2002).

February 10, 2003 – NTIA files a letter in response to the FCC’s 2001 NPRM, analyzing interference issues in the context of an integrated satellite network and confirming its commitment to protect GPS.

- NTIA notes that the Commission has requested comment on proposals to operate ATC base station transmitters that are “to be integrated with the satellite network and will employ directional antennas that are expected to provide coverage to areas where the satellite signal is attenuated by foliage or terrain or to provide in-building coverage.”^{16/}
- It also observes that in the NPRM, “the Commission recognized that the unwanted emissions from terrestrial stations in the MSS will have to be carefully controlled in order to avoid interfering with GPS receivers.”^{17/} Accordingly, “[t]o address the potential interference to GPS, AMS(R)S, and GMDSS receivers, NTIA performed three technical analyses” that are attached to the letter.^{18/}
- NTIA confirms that it “has obtained the views of both industry and the Federal agencies” and that it “would appreciate an opportunity to consider [its] technical analysis with the Commission’s staff.” NTIA also “stands ready to support the implementation of this developing technology *while ensuring the protection of GPS and other safety related systems*.”^{19/}

February 10, 2003 – NTIA submits a follow-up letter to the FCC’s Office of Engineering and Technology reiterating that GPS must be protected in multiple contexts.

- NTIA explains that it had “recommended equivalent isotropically radiated power (EIRP) limits to protect Global Positioning System (GPS) receivers when used in both aviation and terrestrial scenarios.” However, “[t]he technical factors when considering interference to GPS receivers in the aviation and terrestrial scenarios are clearly very different, and emission limits based on aviation applications will not protect terrestrial applications of GPS from received interfering signal levels above the acceptable level at separation distance less than 30 meters from the MSS ATC stations. NTIA believes that our goal must be to protect those critical terrestrial applications of GPS and that the emission limits should be based on desired signal levels, distance separations and antenna couplings consistent with this use.”^{20/}
- NTIA adds: “We are very reluctant and concerned [about] any relaxation of the emission level limits in the GPS bands that would seriously limit the many critical uses of

^{16/} Letter from Fredrick R. Wentland, Acting Associate Administrator of the Office of Spectrum Management, NTIA, to Mr. Donald Abelson, Chief of the International Bureau, FCC, IB Docket No. 01-185, at 1 (filed Feb. 10, 2003).

^{17/} *Id.*

^{18/} *See id.* at 2.

^{19/} *Id.* at 4 (emphasis added).

²⁰ Letter from Fredrick R. Wentland, Acting Associate Administrator of the Office of Spectrum Management, NTIA, to Mr. Edmond Thomas, Chief of the Office of Engineering and Technology, FCC, IB Docket No. 01-185, at 1-2 (filed Feb. 10, 2003).

terrestrial GPS services. We will work closely with the FCC to ensure that proper consideration is given to protection of the terrestrial GPS service.”^{21/}

II. THE FCC AUTHORIZES LIMITED ATC OPERATIONS, SUBJECT TO CERTAIN CONDITIONS DESIGNED TO ENSURE THAT THE TERRESTRIAL OPERATIONS REMAIN TRULY “ANCILLARY” (2003 – 2004)

In response to the requests by MSV and others for the Commission to authorize limited “fill in” terrestrial service in the MSS bands, the Commission in 2003 adopted rules permitting MSS licensees to apply for ATC authorizations, but subjected the terrestrial authorizations to various restrictions intended to preserve the ancillary, “fill in” nature of the service. The Commission unequivocally stated that it will not permit such ancillary terrestrial operations to become a “stand-alone” terrestrial service. The Commission noted that the technical restrictions on the service would protect existing services, like GPS. All relevant parties’ collective understanding regarding the limited nature of the authorized terrestrial services is reflected again in the proceedings surrounding the Commission’s 2004 grant of ATC authority to LightSquared’s predecessor MSV.

Detailed Timeline

February 10, 2003 – The Commission issues a Report and Order and NPRM permitting MSS licensees to integrate supplemental terrestrial operations into satellite operations, stating that it will not permit the terrestrial component to become a stand-alone service and adopting rules to ensure protection of GPS devices.

- While the Commission modifies its rules to allow MSS providers to integrate ATC to augment their primary satellite services, it makes clear that stand-alone terrestrial services are prohibited and will not be tolerated. The Commission states that “[w]e do not intend, nor will we permit, the terrestrial component to become a stand-alone service.”^{22/} In order to “ensure that the added terrestrial component remains ancillary to the principal MSS offering,” the Commission imposes certain conditions and technical parameters on the service, including, among others, a requirement that any terrestrial services be fully *integrated* with existing satellite operations, a mandate that ATC operators provide substantial satellite service at all times, and technical requirements protecting adjacent band operations.^{23/}

^{21/} *Id.* at 3.

^{22/} *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962, ¶ 1 (2003) (“2003 Order”); *see also id.* ¶ 67 (“Our decision to permit MSS ATC is based upon the premise that ATC remains ‘ancillary’ to a fully operational space-based MSS system.”).

^{23/} *See, e.g., id.* ¶¶ 87-88 (“MSS licensees must make an affirmative showing to the Commission that demonstrates that their ATC service offering is truly integrated with their MSS offering This integrated service requirement and the other rules adopted today will help ensure that MSS remains first and foremost a satellite service and that the terrestrial component remains ancillary to the primary purpose of the MSS system.”).

- The Commission notes the consensus of all commenters “[c]oncerning the merits of requiring ancillary operation,” stating that “commenters generally agree that, if ATC is permitted, MSS operators should . . . integrate ATC offerings with the principal MSS offering . . . [and] use ATC simply to augment signals, consistent with MSS operations rather than create a materially different service.” The Commission expressly states that “[b]oth commenters that support and those that oppose ATC caution against allowing a terrestrial component designed to augment MSS to become a freestanding terrestrial mobile service in spectrum allocated domestically and internationally for MSS use” and that “[t]o the extent ATC is authorized, commenters generally support adopting the limiting principles on ATC operation.”^{24/}
- The Commission notes that the purpose behind allowing MSS licensees to integrate ATC into their MSS networks is to enable them to provide terrestrial services in locations where the satellite cannot reliably deliver a strong enough signal.^{25/} ATC was therefore seen merely as a “gap filler” to enhance the primary mobile satellite service, not to displace it.^{26/}
- The FCC also states that it does not expect ATC services to be comparable to and therefore competitive with the services of established consumer terrestrial services like cellular.^{27/} In fact, the FCC uses the distinction between ATC and cellular-like services to support its legal conclusion that the ATC spectrum should not be auctioned, as is most terrestrial wireless spectrum.^{28/}
- The FCC notes MSV’s incentive and efforts to eliminate self-interference to its satellite operations caused by supplemental terrestrial operations.^{29/} The Commission also acknowledges “the importance of providing adequate interference protection to Inmarsat,” and thus restricts MSV “to operate only 50% of its permitted base stations per channel (*viz.*, 50% of 1725, or 863 stations) during an initial 18-month, phase-in period.”^{30/} It further adopts a requirement for power reduction from MSS/ATC handsets when they operate outside buildings (structural attenuation), limits on base station power

^{24/} *Id.* ¶ 70 (citing statements by a wide variety of commenters, including MSV).

^{25/} *Id.* ¶ 23 (finding that by “filling gaps in the MSS coverage area . . . , MSS ATC should [] permit customers in underserved or unserved terrestrial markets to use ATC-enabled MSS handsets when in urban areas or inside buildings”); *id.* ¶ 24 (“[I]mproved coverage in urban areas should significantly expand the consumer market that MSS is capable of serving.”).

^{26/} *See id.* ¶ 68 (“[B]y using the term ‘ancillary,’ we intended to exclude ‘services that differ materially in nature or character from the principal services offered by MSS providers.’”) (citation omitted).

^{27/} *See id.* ¶¶ 39-41 (“As a preliminary matter, terrestrial [Commercial Mobile Radio Service (‘CMRS’)] and MSS ATC are expected to have different prices, coverage, product acceptance and distribution; therefore, the two services appear, at best, to be imperfect substitutes for one another that would be operating in predominately different market segments. . . . MSS ATC is unlikely to compete directly with terrestrial CMRS for the same customer base . . .”).

^{28/} *See id.* ¶¶ 220, 225.

^{29/} *See id.* ¶¶ 130-188.

^{30/} *Id.* ¶ 143.

and antenna gain, and out-of-channel emissions limits.^{31/} These limits indirectly protect GPS operations by limiting in-band MSS operations.

- The Commission finds that the requirements and technical parameters it adopts are essential to the “ancillary” licensing regime and that deviations from such requirements and parameters will not be tolerated:

As explained below, an MSS licensee that wishes to include ATC must meet certain requirements We view full and complete compliance with each of the requirements as essential to the integrity of our ‘ancillary’ licensing regime. Without the integrity afforded by these MSS ATC service rule requirements, an alternative licensing or distribution mechanism should be used. Thus, failure of an MSS operator to meet any of the ATC service requirements set forth in our Rules and this Order may result in enforcement action, including the imposition of a monetary forfeiture in addition to the loss of ATC and MSS operating authority.^{32/}

- The Commission states that its technical rules are designed to, among other things, prevent interference to existing adjacent band operations, like GPS, and places responsibility on the ATC operator to alleviate any interference it may cause:

We adopt technical parameters for ATC operations in each of the bands at issue designed to protect adjacent and in-band operations from interference from ATC. We fully expect that these operational parameters will be sufficient. Nevertheless, in the unlikely event that an adjacent MSS or other operator does receive harmful interference from ATC operations, either from ATC base stations or mobile terminals, the ATC operator must resolve such interference.^{33/}

In this regard, the Commission adopts Section 25.255 of its rules, which states: “If harmful interference is caused to other services by ancillary MSS ATC operations, either from ATC base stations or mobile terminals, the MSS ATC operator must resolve any such interference.”^{34/}

- The Commission provides the first in a series of clear assurances that GPS will be protected from interference. The Commission specifically states that it addressed prevention of interference to GPS in its technical regime for ATC operations, noting that it “evaluated the potential interference to the Global Positioning System (GPS) from ATC [operations] in the L-band” and “recognized that the unwanted emissions from terrestrial stations in the MSS will have to be carefully controlled in order to avoid interfering with

^{31/} See *id.* ¶¶ 148-188.

^{32/} *Id.* ¶ 66; see also *id.* ¶ 69 (“To avoid confusion, therefore, we decline to adopt in our rules a definition of the term ‘ancillary,’ and instead clarify that the term ‘ancillary,’ with respect to MSS ATC, is defined as terrestrially-based, in-band MSS operations meeting the technical and policy requirements set forth in this Order.”).

^{33/} *Id.* ¶ 104.

^{34/} 47 C.F.R. § 25.255.

GPS receivers.”^{35/} The Commission vows to take any additional actions necessary to ensure the continued protection of GPS operations:

We recognize the importance of the GPS system to commercial, government and consumer users. We fully support and encourage negotiations among parties whose operations may affect GPS. In certain instances, concerns have been expressed, including by Federal agencies, regarding protection of GPS operations. Though we are adopting [certain technical limits] for ATC operations, we plan to continue to assess the appropriate interference protection levels for GPS.^{36/}

- The Commission recognizes the risk of overload interference to certain devices and adopts restrictions to protect the relevant services.^{37/}
- Recent congressional testimony from a former government official, now an independent academic and leading expert on GPS issues, who was directly involved in inter-governmental consultations on proposed terrestrial use of the MSS band in 2003, confirms that government users and industry all had the same view regarding the intended nature of ATC operations. At a House hearing on February 8, 2012 regarding the LightSquared proceeding, Dr. Scott Pace confirms that ATC was widely viewed as a “gap filler” and that standalone terrestrial services were not permitted. Dr. Pace states that “[w]hen this originally started back in about 2003, the idea of an ancillary terrestrial component to mobile satellite service was considered a kind of a fill-in, a gap-filler, a relatively low-power system. No one was talking about 40,000 high-powered cell towers blanketing the country. Nobody was talking about having an independent terrestrial service separate from the satellite services. The FCC was very clear over the years that they would not allow a separate, standalone, service, that, in fact, it always had to be tied to the satellite service, and no interference with the satellite service would occur.”^{38/} He adds:

Terrestrial broadband systems would not interfere with mobile satellite services in their own band, what they call co-channel interference, which is a really big sin. So I think that the position of people at that time was to try to find some way to make these ancillary systems work. I think it was a good faith technical effort. There was really no technical data available then. And then people gradually,

^{35/} 2003 Order ¶ 180.

^{36/} *Id.* ¶ 184.

^{37/} See, e.g., *id.* ¶ 203 (“ATC operators shall take such steps necessary to avoid causing brute force overload interference to previously licensed facilities. If a mutual agreement to this effect cannot be reached, the Commission must be notified and it will take such action as may be necessary to ensure that a mutually acceptable arrangement is arrived at. In any event, ATC operators will be required to protect against adjacent-channel and brute-force overload interference to previously licensed users.”).

^{38/} *A Review of Issues Associated with Protecting and Improving Our Nation’s Aviation Satellite-Based Global Positioning System Infrastructure: Hearing Before the Subcomm. on Aviation of the Comm. on Transportation and Infrastructure, 112th Cong. at 25 (Feb. 8, 2012) (testimony of Dr. Scott Pace, Director, Space Policy Institute, Elliott School of International Affairs, The George Washington University).*

gradually got into trying to change it into something else, a reallocation. And they did not do a notice of proposed rulemaking. And hence, I think people were surprised when they found out that when they actually got data, that it was a much different situation than what they had intended.^{39/}

- September 2011 congressional testimony from General Shelton, a high ranking Department of Defense official with expertise on GPS and its military applications, also demonstrates Federal users' understanding that the primary satellite services authorized in the MSS band were authorized in a "quiet" spectrum neighborhood in order to protect GPS. General Shelton observes:

[T]he frequency band that we're talking about here has, by FCC rulings in the past, [] always been intended to be a, quote, unquote, 'quiet neighborhood'; that GPS could coexist with other signals of the same magnitude. GPS is a very weak signal coming from space. It's a spread spectrum signal. It takes very special processing by receivers to pull that signal out of the background noise. If you have signals of a similar strength to GPS, that's not a problem for the receiver. However, if you put a rock band in the middle of that very quiet neighborhood, it's a very different sort of circumstance.^{40/}

June 4, 2003 – MSV requests ATC authority to supplement its existing satellite service.

- MSV requests ATC authority, expressly recognizing that "[t]o request ATC authority, an MSS licensee must submit an application demonstrating that its proposed system complies with rules designed to ensure that ATC remains ancillary to the principal MSS offering and with the technical rules designed to protect other services from harmful interference."^{41/}
- MSV thus "certifies and . . . demonstrates by technical explanation . . . [that] MSV will offer an integrated service of MSS and MSS ATC."^{42/}

November 8, 2004 – The FCC's International Bureau releases an Order and Authorization granting MSV authority to operate supplemental terrestrial facilities, noting that the terrestrial authority must augment, not supplant, the existing satellite service.

- While the FCC's International Bureau grants the MSS/ATC application of MSV authorizing ATC, it reaffirms the Commission's emphasis on the "ancillary" nature of the

^{39/} *Id.*

^{40/} *Sustaining GPS for National Security: Hearing Before the Subcomm. on Strategic Forces of the H. Comm. on Armed Services*, 112th Cong. at *10 (Sept. 15, 2011) (oral testimony of General William L. Shelton, Commander, Air Force Space Command), *available at* http://findarticles.com/p/news-articles/political-transcript-wire/mi_8167/is_20110916/rep-michael-turner-holds-hearing/ai_n58165676/.

^{41/} Application for Minor Modification and Amendment of Mobile Satellite Ventures Subsidiary LLC, IBFS File No. SAT-MOD-20030604-00110, at 3 (filed June 4, 2003).

^{42/} *Id.* at 9-10.

terrestrial service, declaring that “[t]he Commission’s decision to permit implementation of MSS ATC was based on the premise that ATC must be ‘ancillary’ to MSS operation.”^{43/}

- The Bureau also notes that “the Commission established ‘gating’ requirements for ATC authorization and operation to ensure that ATC will augment, rather than supplant, MSS. In order to satisfy the gating requirements, . . . an MSS-ATC licensee must, among other things, . . . integrate its offering of ATC services with its offering of MSS.”^{44/}
- Moreover, the authorization is premised on the ability of MSV to meet the “integrated service” safe harbor by offering dual-mode handsets – *i.e.*, handsets capable of receiving both satellite and terrestrial services.^{45/}

III. THE FCC CONTINUES TO AFFIRM, AND LIGHTSQUARED’S PREDECESSORS REPEATEDLY CONFIRM THEIR UNDERSTANDING, THAT ONLY LIMITED TERRESTRIAL ATC OPERATIONS ARE AUTHORIZED AND THAT GPS SERVICES WILL BE PROTECTED; INTERFERENCE MEASURES ARE ADOPTED PREMISED ON THE LIMITED NATURE OF THE PERMITTED TERRESTRIAL SERVICES (2005 – 2010)

The Commission confirmed again and again for all stakeholders – including in 2004, 2005, 2006, 2009, and 2010 – that because of the potential harm to services such as GPS, the MSS terrestrial component was required to be ancillary to, and integrated with, the underlying satellite service and that stand-alone terrestrial services would not be permitted. The FCC also reiterated its commitment to protect GPS and promised to coordinate with affected Federal government agencies before taking any steps that would jeopardize GPS.

During this period, statements of LightSquared predecessors MSV and SkyTerra Subsidiary, LLC (“SkyTerra”) confirm their understanding that their authorization permitted them to deploy only *integrated* satellite-terrestrial services, and not a stand-alone terrestrial network, in part, to protect GPS reception. The GPS industry relied upon MSV’s and SkyTerra’s expressed understanding of the limitations on their operations and on their and the Commission’s unequivocal statements regarding the permitted and intended nature of the terrestrial operations. In fact, LightSquared’s predecessor SkyTerra and the GPS industry negotiated technical restrictions governing LightSquared’s operations to mitigate OOB interference based on the limited fill-in, fully integrated operations authorized under the FCC’s policies.

^{43/} *Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License for AMSC-1, et al.*, Order and Authorization, 19 FCC Rcd 22144, ¶ 18 (2004).

^{44/} *Id.*

^{45/} *See id.* ¶¶ 19-21 (“MSV asserts that the handsets that will be used to access its ATC network will be dual-mode devices that can also be used for MSS communication The ATC authorization granted by this order is conditioned accordingly.”).

Detailed Timeline

February 25, 2005 – The FCC releases a Memorandum Opinion and Order and Second Order on Reconsideration revising its 2003 ATC rules and reiterating that stand-alone terrestrial services will not be allowed and that it will ensure protection of GPS.

- The Commission confirms that MSS operators cannot use ATC authority for stand-alone terrestrial operations:

We reiterate our intention not to allow ATC to become a stand-alone system. The purpose of ATC is to enhance MSS coverage, enabling MSS operators to extend service into areas that they were previously unable to serve, such as the interiors of buildings and high-traffic density urban areas. We will not permit MSS/ATC operators to offer ATC-only subscriptions, because ATC systems would then be terrestrial mobile systems separate from their MSS systems.^{46/}

- The Commission reiterates that to “ensure that ATC will be ancillary to the provision of MSS . . . [w]e require[] the offer of MSS and ATC services to be integrated” and that MSS/ATC operators have to make a showing to that effect.^{47/}
- The FCC also expressly commits to proactively protect GPS from harmful interference by consulting with affected government users and by adopting whatever rules might be necessary in the future.^{48/} The Commission notes that certain “protection levels for GPS are warranted” and that it will “ensure that all FCC services provide adequate protection to GPS.”^{49/}
- While in 2003 the FCC imposed certain restrictions on the number of permitted terrestrial transmitters operating in the L-Band in order to protect Inmarsat, the other MSS operator

^{46/} *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Memorandum Opinion and Order and Order and Second Order on Reconsideration, 20 FCC Rcd 4616, ¶ 33 (2005).

^{47/} *See id.* ¶ 19.

^{48/} *See id.* ¶ 70 (“While we agree with the GPS Industry Council, NTIA, and other government agencies that it is essential to ensure that GPS does not suffer harmful interference, it is also important to ensure that new technologies are not unnecessarily constrained. In this regard, we recognize that the President’s new national policy for space-based positioning, navigation, and timing (PNT) directs the Secretary of Commerce to protect the radio frequency spectrum used by GPS and its augmentations through appropriate domestic and international spectrum management regulatory practices Furthermore, the President’s PNT policy calls for the establishment of an inter-agency Executive Committee, on which the Chairman of the FCC will be invited to participate as a liaison, and a National Space-Based PNT Coordination Office. *It is our intention to establish discussions with other agencies, through the PNT Executive Committee and Coordination Office as appropriate, to better understand what protection levels for GPS are warranted.* The results of those discussions may lead to future rulemaking proposals in order to ensure that all FCC services provide adequate protection to GPS, and produce a more complete record upon which to establish final GPS protection limits for MSS ATC licensees.”) (*emphasis added*).

^{49/} *Id.*

in the band, the FCC decides to remove these restrictions. The Commission clearly states, however, that these changes are not intended to increase the scope of permitted terrestrial operations or the overall level of permitted interference but rather to allow MSS operators more flexibility in managing their networks and any interference that may be caused by them:

[U]nder this approach, L-band MSS/ATC providers will have a strong incentive to innovate, in order to get the maximum possible coverage and efficiency within their interference ‘budget’ by using interference reduction techniques. . . . Because we are allowing MSS/ATC providers to apportion their interference budget between MSS and ATC according to their own designs and business plans, and to change those apportionments without further approval as long as the sum of the ATC and MSS interference remains below the levels required, we have little basis for limiting the number of base stations or mobile handsets [W]e believe that it is important to allow MSS/ATC licensees flexibility to design their ATC in accordance with technical and market demands. We have decided that a better way to achieve this goal is to limit the total interference that an ATC may cause, rather than dictating system design features.^{50/}

The Commission confirms that its elimination of this restriction “does not affect the terms of MSV’s ATC authorization” and reiterates that “MSV must conform to all the terms of its ATC authorization unless it applies for modification of its license and demonstrates that the modifications it proposes would be consistent with the limits on interference we adopt here.”^{51/}

September 15, 2006 – The FCC approves the transfer of control of MSV to SkyTerra Communications, Inc., noting the integrated nature of the authorized satellite-terrestrial services.

- The FCC notes that the application states that approval of the transfer of control would “facilitate MSV’s development of its planned *integrated* satellite and terrestrial network.”^{52/}

December 8, 2008 – MSV changes its corporate name to SkyTerra Subsidiary, LLC (“SkyTerra”).

^{50/} *Id.* ¶¶ 47, 50.

^{51/} *Id.* ¶ 51 n.119.

^{52/} *Motient Corporation and Subsidiaries, Transferors, and SkyTerra Communications, Inc., Transferee, Application for Authority to Transfer Control of Mobile Satellite Ventures Subsidiary LLC*, Memorandum Opinion and Order and Declaratory Ruling, 21 FCC Rcd 10198, ¶ 22 (2006) (*emphasis added*).

March 27, 2009 – Harbinger Capital Partners Funds (“Harbinger”) files an application requesting FCC approval for the transfer of control of SkyTerra to Harbinger.

- The parties assert that the transfer “would enhance spectrum efficiency in the L-band, while solidifying the foundation for the development of an *integrated* satellite-terrestrial communications network that would provide critical public safety services, essentially immune to local disasters, and coverage for consumer handsets both to the most rural and underserved areas of this country and Canada and to urban centers.”^{53/}
- They also note that the Commission has “encouraged further private negotiations among the operators in an effort to produce more ‘efficient interference levels than regulations based on largely hypothetical cases.’”^{54/}

April 29, 2009 – LightSquared predecessor SkyTerra files an application requesting modification of its ATC authorization to deploy additional terrestrial, low-power “fill in” services.

- SkyTerra requests modification of its authorization “to deploy an integrated terrestrial component that is more robust and has greater capacity than is permitted by the existing interference-related technical rules.”^{55/}
- In particular, SkyTerra requests authorization to deploy limited, low-power microcell and femtocell base stations.^{56/}

May 1, 2009 – The Commission seeks comment on the Harbinger-SkyTerra transfer, again noting the integrated nature of the terrestrial component.

- The FCC reports that SkyTerra is “developing an integrated satellite-terrestrial communications network.”^{57/}

^{53/} SkyTerra Communications, Inc., Transferor, Harbinger Capital Partners Funds, Transferee, Applications for Authority to Transfer Control of SkyTerra Subsidiary LLC, Narrative, IB Docket No. 08-184, at 2-3 (filed Mar. 27, 2009), *as amended by* Letter from Joseph A. Godles, Counsel for Harbinger Capital Partners Funds, to Marlene H. Dortch, Secretary, FCC (dated March 31, 2009).

^{54/} *Id.* at 26.

^{55/} Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License (AMSC-1), *et al.*, Modification and Request for Expedited Consideration, IBFS File No. SAT-MOD-20090429-00047, *et al.*, at 2 (filed Apr. 29, 2009).

^{56/} *See id.* at 9 n.24 (“[SkyTerra’s Coordination Agreement with Inmarsat] provides SkyTerra flexibility to deploy a variety of different equipment configurations, as long as the emissions remain within equivalent acceptable limits. To this end, the agreement contemplates base stations that operate at different power levels. The term ‘BTS’ refers to a standard power base station with a maximum EIRP of 32 dBW/MHz per sector. A ‘microcell’ is a base station with EIRP between -4 and 10 dBW/MHz, whether deployed indoors or outdoors. A ‘femtocell’ is a base station deployed indoors with less than -4 dBW/MHz EIRP.”). In order to provide context regarding the limited power of such operations, the maximum power for microcells is 1/160 of the BTS power level, and the maximum power listed for femtocells is 1/4000 of the BTS power level. Accordingly, the microcells and femtocells contemplated by SkyTerra in 2009 were not the ubiquitous, cellular-like base stations contemplated by LightSquared in 2010.

July 10, 2009 – USGIC submits comments proposing a modification of the OOB interference limits to account for the additional terrestrial “fill in” delivery mechanisms – low power “femtocells” and microcells – proposed by SkyTerra in its modification application.

- USGIC explains that “SkyTerra now proposes to deploy microcell and femtocell technology that had not been developed in 2002, and to deploy this technology ubiquitously, indoors and outdoors, and in the hundreds of thousands of units operating in the band adjacent to the GPS L-1 signal.”^{58/}
- Given the low-power, “fill in” character of such localized microcell and femtocell operations, USGIC only proposes a modification of the earlier agreed upon OOB limits taking into account these additional network elements – there was no concern that such operations would create widespread overload interference.^{59/}

August 13, 2009 – USGIC submits a letter to the Commission indicating its agreement with SkyTerra regarding out-of-band emissions limits.

- USGIC states: “We are pleased to inform you that . . . the U.S. GPS Industry Council (‘Council’) and SkyTerra have agreed on out-of-band emissions (‘OOB’) limits for the operation of low-power base stations with a maximum EIRP of -4 dBW/MHz that are intended to be deployed indoors (‘femtocells’) and personal computer (‘PC’) data cards communicating with such base stations.”^{60/}
- While LightSquared’s advocacy over the past year or so routinely points to such negotiations and agreements between LightSquared and the GPS industry as “evidence” that the GPS community “acquiesced” to its plans, this cooperation constituted good faith efforts to allow LightSquared to operate in the limited manner its ATC authorization permitted consistent with its obligations to protect GPS reception. For example, LightSquared’s recent advocacy alleges that USGIC’s acknowledgement that there could be “hundreds of thousands” of additional terrestrial units is evidence of industry acquiescence to its November 2010 proposal to build 40,000 high-powered cell sites. These claims are a gross mischaracterization of the context and content of these statements. Since microcells were intended to provide coverage within, for example, an office building, to provide in-building coverage, and femtocells were generally intended to provide coverage within a single residence, a mature, fully integrated satellite service could easily involve hundreds of thousands of low power terrestrial transmitters, including handsets, and low power cells with much less potential for interference than the

^{57/} *SkyTerra Communications, Inc., Transferor, and Harbinger Capital Partners Funds, Transferee, Seek FCC Consent to Transfer Control of SkyTerra Subsidiary, LLC*, Public Notice, 24 FCC Rcd 5226 (2009).

^{58/} Comments of the U.S. GPS Industry Council, IBFS File No. SAT-MOD-20090429-00047, *et al.*, at 2-3 (filed July 10, 2009).

^{59/} *Id.* at 2-5.

^{60/} Letter from Bruce D. Jacobs, Counsel for SkyTerra, and Raul R. Rodriguez, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, at 1 (filed Aug. 13, 2009).

ubiquitous network of high-powered cell sites contemplated by LightSquared's subsequent November 2010 filing.

November 18, 2009 – The FCC's International Bureau seeks additional information from Harbinger regarding how it plans to provide ATC.^{61/}

December 11, 2009 – Harbinger provides the FCC's International Bureau with a response, the public version of which is highly redacted, indicating that it plans to use its ATC authorization to provide terrestrial services but without including information that would provide third parties with information that such services will be stand-alone, if that was the intent.

- Harbinger states that it “plans to construct a new and open terrestrial LTE network with its own unique architecture. Harbinger plans to use ATC as core spectrum in developing an integrated satellite/terrestrial mobile broadband network that will provide both satellite and terrestrial communications services designed to meet increasing consumer demand for data-intensive wireless telecommunications services, to provide traditional mobile satellite services to end users such as public safety and emergency services agencies, and to spur availability and demand for wireless services in rural areas underserved by current terrestrial wireless providers.”^{62/} It does not request permission to offer terrestrial-only services.

February 26, 2010 – Harbinger files a letter with the FCC discussing its business model, noting that it will include a terrestrial network using an unspecified combination of MSS and non-MSS terrestrial spectrum. Harbinger does not disclose plans to provide stand-alone terrestrial services prohibited by FCC rules and policies. Harbinger specifically refers to non-MSS terrestrial spectrum that it intends to use in its nationwide LTE network.

- Harbinger states that it “plans to develop a nationwide terrestrial broadband mobile 4G LTE network, which, without regard to satellite coverage, will provide wireless data on a nationwide basis. The network will employ MSS spectrum, Ancillary Terrestrial Component (‘ATC’) spectrum, and terrestrial-only spectrum, as well as spectrum hosting and pooling agreements, all supplemented as appropriate with roaming agreements.”^{63/}
- Harbinger adds that “[a]t the outset, the network will have no less than 23 MHz of spectrum, consisting of 8 MHz of 1.4 GHz terrestrial spectrum, access to 5 MHz of 1.6 GHz terrestrial spectrum and 10 MHz of MSS/ATC L-band spectrum. . . . Harbinger also is discussing with other Commission licensees the possibility of hosting or pooling their spectrum in order to enable them on the terrestrial wireless network, *i.e.*, the spectrum would be incorporated into the infrastructure of the terrestrial wireless network. The

^{61/} See Letter from Roderick Porter, Deputy Bureau Chief, International Bureau, FCC, to Mr. Henry Goldberg *et al.*, Counsel to Harbinger (dated Nov. 18, 2009).

^{62/} Letter from Henry Goldberg and Joseph A. Godles, Counsel for Harbinger, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 08-184, at 14 (filed Dec. 11, 2009).

^{63/} Letter from Henry Goldberg and Joseph A. Godles, Counsel for Harbinger, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 08-184, at Attachment, at 1 (filed Feb. 26, 2010).

hosted or pooled spectrum then could be integrated with Harbinger's spectrum to enhance the broadband capacity of the terrestrial network."^{64/}

- None of the statements in Harbinger's business model filing give any indication that it planned to build 40,000 cell sites blanketing the country *using L-Band MSS spectrum*, much less the spectrum immediately adjacent to GPS, as it ultimately proposed. In fact, Harbinger's statements about its access to and use of terrestrial-only spectrum, when considered in the context of the Commission's longstanding restrictions on the use of ATC spectrum, suggested the opposite. This is especially the case since the FCC reiterated these restrictions again in the *National Broadband Plan*, released just a few weeks later, as described below.

March 16, 2010 – The *National Broadband Plan* is released. It recognizes that stand-alone terrestrial operations are not permitted in the L-Band and recommends that the Commission work with other federal agencies to evaluate freeing satellite spectrum for terrestrial-only use.

- The *National Broadband Plan* recognizes that MSS licensees, like SkyTerra, do not have authority to operate freestanding, ubiquitous terrestrial networks, stating that the ATC authorizations the FCC previously granted to MSS licensees allow "MSS providers to deploy terrestrial networks to enhance coverage in areas where the satellite signal is attenuated or unavailable."^{65/} The *National Broadband Plan* further recognizes that the rules require MSS licensees to "integrate MSS and ATC services."^{66/}
- The *National Broadband Plan* recommends that the Commission "take action to accelerate terrestrial deployments in the MSS bands," including the L-Band and the 2 GHz band.^{67/}
- The *National Broadband Plan* expressly states that the Commission will "work closely" with "other government agencies," "foreign governments" and L-Band licensees to make L-Band spectrum "usable for broadband ATC service."^{68/}

March 26, 2010 – The FCC's International Bureau approves the transfer of control of SkyTerra to Harbinger and issues an Order and Authorization modifying SkyTerra's authority but leaving intact the prohibition on terrestrial-only services.

- The FCC approves the transfer of control of the company that has since become LightSquared to its current owners.^{69/} The FCC makes certain changes to the technical

^{64/} *Id.*

^{65/} *Connecting America: The National Broadband Plan*, at 87 ("National Broadband Plan"), available at <http://www.broadband.gov/download-plan/>.

^{66/} *Id.*

^{67/} *Id.* at 88.

^{68/} *Id.*

^{69/} *See SkyTerra Communications, Inc., Transferor, and Harbinger Capital Partners Funds, Transferee, Applications for Consent to Transfer of Control of SkyTerra Subsidiary, LLC*, Memorandum Opinion and Order and Declaratory Ruling, 25 FCC Rcd 3059 (2010).

rules governing SkyTerra's authority, including adopting the out-of-band emissions limits agreed upon by USGIC, but does not address the integrated service requirements or the provision of terrestrial-only services in the L-Band. As a result, basic policies requiring terrestrial services to be ancillary to, and integrated with, the primary satellite service remain in place.^{70/}

- The order also imposes a condition that "SkyTerra shall construct a terrestrial network to provide coverage to at least 100 million people in the United States by December 31, 2012; to at least 145 million people in the United States by December 31, 2013; and to at least 260 million people in the United States by December 31, 2015," thus requiring that the terrestrial component of SkyTerra's proposed satellite-terrestrial network will ultimately cover over 90 percent of the U.S. population.^{71/} The Commission, however, expressly acknowledges that LightSquared has both MSS and non-MSS terrestrial spectrum available to it and that the build-out conditions can be met using any combination of such spectrum assets. The condition specifically provides that SkyTerra can satisfy its build-out requirement using its MSS L-Band *or other spectrum it has or obtains the right to use*, stating that "[f]or purposes of this Condition 2, 'terrestrial network' shall mean the network comprised of: (a) SkyTerra's L-band spectrum used by its terrestrial network; (b) other terrestrial spectrum that SkyTerra is the licensee of or has access to under a spectrum manager lease or *de facto* transfer lease and deploys to provide the coverage and level of service requirements described [herein]; and (c) any other terrestrial spectrum that is used by SkyTerra's terrestrial network or is made available to SkyTerra for pooling with its spectrum and that SkyTerra deploys to provide the Coverage and level of service requirements . . ."^{72/} Again, there is no indication that SkyTerra is permitted or intends to use its L-Band spectrum only to provide ubiquitous, stand-alone terrestrial services, or that prior limitations on MSS terrestrial operations have been modified to widely deploy stand-alone terrestrial services to meet the build-out condition, given the other spectrum held by SkyTerra where such ubiquitous terrestrial operations are permitted.

IV. THE FCC CONSIDERS EXPANDING TERRESTRIAL USE OF THE L-BAND, PROMPTING PRIVATE AND GOVERNMENT CONCERNS REGARDING OVERLOAD INTERFERENCE TO GPS DEVICES (2010)

From the foregoing it is clear that as recently as March 2010, Harbinger and SkyTerra were on clear notice that current FCC policies did not permit ubiquitous use of MSS spectrum for free-standing terrestrial broadband services, and none of the FCC filings to that point had provided an indication of their intent to do so. The March 2010 *National Broadband Plan* contained an explicit reminder of these restrictions, and the FCC's transfer approval order, which SkyTerra negotiated and agreed to, contemplated that its nationwide build-out requirements would have to be met using any combination of spectrum that SkyTerra had available, including

^{70/} See *SkyTerra Subsidiary LLC Application for Modification Authority for an Ancillary Terrestrial Component*, Order and Authorization, 25 FCC Rcd 3043, ¶ 27 (2010).

^{71/} *Id.* at Appendix B, at Attachment 2.

^{72/} *Id.* (emphasis added).

the conventional terrestrial spectrum that SkyTerra represented to the FCC that it had available for use. For LightSquared to claim, as it has repeatedly, that the ubiquitous terrestrial build-out using MSS spectrum proposed in November 2010 was explicitly contemplated prior to this point, much less authorized or required, is completely devoid of support in the record. Any investments that Harbinger made before or after that point premised on such a use of MSS spectrum were essentially a bet on the outcome of future regulatory proceedings, in the face of almost a decade of contrary decisions. In any case, FCC rules and policies protecting GPS from interference remained in place, as reflected in the International Bureau's January 2011 waiver decision, which reaffirmed that LightSquared would not be permitted to move forward with its November 2010 proposal if the proposed operations would cause interference to GPS.

In July 2010, the Commission initiated an inquiry proposing to expand terrestrial use of the L-Band. The GPS industry responded by stating that increasing terrestrial use of the L-Band could cause overload interference to GPS devices.

Detailed Timeline

July 15, 2010 – The Commission releases an NPRM and Notice of Inquiry (“NOI”) that proposes various rule changes to the 2 GHz MSS band and considers ways to promote terrestrial use of all MSS bands.

- The Commission proposes to add domestic co-primary Fixed and Mobile service allocations to the 2 GHz band (2000-2020 MHz/2180-2200 MHz) consistent with the International Table of Allocations.^{73/}
- The Commission also proposes to apply its secondary market policies applicable to terrestrial services to transactions involving the use of the MSS bands for terrestrial use. The Commission does *not* propose to modify the integrated service requirement to allow stand-alone terrestrial operations in the L-Band.^{74/}
- While noting the importance of maintaining satellite service in the MSS bands, the Commission indicates that it would like to expand terrestrial use of the MSS bands and inquires as to whether interested parties seek “to offer satellite and terrestrial services independent of each other or as part of combined, integrated network offerings.”^{75/}

July 20, 2010 – SkyTerra is renamed LightSquared.

^{73/} See *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, Notice of Proposed Rulemaking and Notice of Inquiry, 25 FCC Rcd 9481 (2010) (reporting that when the Commission coordinated ATC use of MSS spectrum with NTIA, it “indicated that the service rules for MSS ensure compatible operation with Federal systems in and adjacent to the bands allocated to the MSS, but that a more detailed review would be appropriate if changes to those rules are required”) (*emphasis added*).

^{74/} *Id.* ¶¶ 17-25.

^{75/} *Id.* ¶¶ 31-34.

September 15, 2010 – LightSquared files comments on the July 2010 NPRM and NOI, characterizing its terrestrial operations as “ancillary” and acknowledging that it is responsible for protecting other services.

- LightSquared acknowledges that “ATC in the L-band, because it lacks a primary allocation in the United States, may have to protect other services and to accept interference from other services The Commission could, however, make it substantially easier to implement ATC domestically in the future by expanding the definition of MSS in its rules to include ATC and thus rendering ATC a primary service.”^{76/}

September 15, 2010 – In response to the FCC’s proposal in its July 2010 NPRM and NOI to potentially expand terrestrial services in the L-Band, USGIC files comments cautioning that significant expansion of terrestrial services in the L-Band would create overload interference concerns and confirming that its previous agreement with LightSquared addressed OOB limits, not overload limits.

- USGIC “urges the Commission to be mindful of the adverse effect” that expansion of terrestrial services in the L-Band could have on existing services like GPS. In particular, USGIC recommends that the Commission take into account overload interference that could arise from the dense deployment of newly proposed mobile terrestrial broadband services.^{77/}
- USGIC confirms that previous negotiations with LightSquared revolved around OOB limits.^{78/} USGIC reiterates that any GPS interference concerns were discussed in the context of what USGIC understood to be a limited, ancillary terrestrial service tethered to and integrated with the primary satellite authorization consistent with FCC rules prohibiting stand-alone terrestrial services in the L-Band, and that permitting broader terrestrial use could cause devastating overload interference to GPS devices.^{79/}
- USGIC also discusses the historical context surrounding ATC operations:

Terrestrial and satellite operations have different physical and geometric characteristics that make it very difficult for the two to co-exist without the terrestrial transmissions interfering with the satellite transmissions. In recognition of this phenomenon, when ATC was introduced in the MSS bands, operators

^{76/} Comments of LightSquared Subsidiary LLC, ET Docket No. 10-142, at 12 (filed Sept. 15, 2010).

^{77/} See Comments of the U.S. GPS Industry Council in Response to Notice of Proposed Rulemaking and Notice of Inquiry, ET Docket No. 10-142, at ii-iii (filed Sept. 15, 2010).

^{78/} See *id.*

^{79/} See *id.* at 8 (“[I]t is also critical for the Commission to take into consideration the fact that the OOB limits set out in the individual MSS licenses were premised on ATC operation alone, *i.e.*, operation that is solely ancillary to primary MSS use. With the introduction of broader mobile terrestrial broadband use now being proposed in the NPRM/NOI, the physical characteristics of the necessary emissions from the dense deployment of this new terrestrial-only service will cause harmful interference to the RNSS receiver.”).

developed the OOB limits cited above that are explicit conditions in FCC authorizations of MSS ATC operations. Even with the advent of ATC, RNSS operators could rely on the requirement that ATC operations remain truly ‘ancillary’ to MSS and subject to intra-system monitoring and coordination. Furthermore, ATC was developed to complement and extend MSS beyond its physical limitations given the power levels and limitation of MSS operations. Nonetheless, the primary and principal purpose of MSS would remain precisely a space-based service function.^{80/}

- Consequently, USGIC states that expanding terrestrial services in the L-Band could result in “what was initially primary MSS with an ancillary terrestrial component [becoming] for all practical purposes multiple terrestrial services operating in a band with adjacent weak broadcast satellite transmissions. . . . This change in the band use will require adjustments in these mobile terrestrial operations to mitigate the detrimental operational interference effect it will otherwise create in adjacent broadcast RNSS bands – adjustments that necessarily go beyond the established OOB limits in existing MSS ATC authorizations.”^{81/}

V. LIGHTSQUARED SUBMITS AN “UPDATED” BUSINESS PLAN PROPOSING FOR THE FIRST TIME HIGH-POWERED, STAND-ALONE TERRESTRIAL OPERATIONS; NTIA AND THE GPS COMMUNITY EXPRESS GREAT CONCERN ABOUT THE POTENTIAL FOR DEVASTATING OVERLOAD INTERFERENCE TO GPS DEVICES (2010 – 2011)

On November 18, 2010, LightSquared submitted an “updated” business plan to the Commission, stating its intention to build a high-powered nationwide terrestrial network and provide stand-alone, ubiquitous terrestrial services under its MSS “ancillary terrestrial component” authorization. LightSquared’s plan, for the first time, turns the regulatory regime on its head by making the satellite services ancillary to the terrestrial services rather than the other way around and abrogating all of the protections for which the GPS industry had worked since 2001. Without the obligation to provide an integrated satellite-terrestrial service, important protections against GPS interference in general and receiver overload in particular would be eliminated. After this request became public, the GPS community – including Trimble – raised concerns regarding the overload issue with relevant Federal agencies, including the FCC and NTIA.

^{80/} *Id.* at 8-9.

^{81/} *Id.* at 9-10; *see also id.* at 10 (“Establishing a precedent of allowing a mobile terrestrial service in the midst of a space-based service operating in the L-band generates an unavoidable interference risk for any nearby satellite service that necessitates careful mitigation measures. In contrast, ATC does not represent such a precedent because it is defined to be ancillary to satellite operations. The rules for ATC require that it only be used by a full coverage space provider to augment the space-based service. . . . This ‘ancillary’ requirement results in the MSS providers who would use ATC being good neighbors to other satellite operations due to the need to protect their own space-to-Earth communication operations.”).

Detailed Timeline

November 18, 2010 – LightSquared submits an “updated” business plan requesting permission to use MSS spectrum for stand-alone terrestrial operations.

- LightSquared states that it plans to build a “nationwide network of 40,000 terrestrial base stations” and that “the capacity of its fully deployed terrestrial network across all base stations will be *tens of thousands of times* the capacity of either of [its] satellites.”^{82/}
- LightSquared acknowledges that “[a]t the time LightSquared’s predecessor applied for ATC authority, the company, in order to demonstrate compliance with the Commission’s integrated service requirements, planned to use dual-mode handsets *exclusively*.”^{83/}
- It nonetheless attempts to claim that its proposed terrestrial and satellite services are “integrated” because the rate card it will present to its wholesale customers (who in turn will resell the service to end customers) will list only combined satellite/terrestrial services.^{84/} As the FCC later determines, these assertions fail to meet the integrated service requirement because under this proposal, wholesale customers are not required to buy specialized dual purpose handsets or sell them to their customers, or even tell their customers that satellite services are available. Customers would thus be allowed to purchase terrestrial only services, in clear violation of prior Commission policies.

November 19, 2010 – The FCC seeks comment on LightSquared’s “updated” business plan, noting that the request is an expansion of LightSquared’s ATC authority.

- The Commission seeks comment on LightSquared’s request to expand its authorization for ATC “to include integration based on the offering of an integrated MSS/Terrestrial chipset” and/or “an integrated MSS/Terrestrial service offering,”^{85/} acknowledging that LightSquared is proposing a new approach to implementing its ATC authorization.

December 2, 2010 – USGIC files comments with the FCC raising concerns about LightSquared’s new proposal and its effect on GPS users.^{86/}

- USGIC explains that “the end result of LightSquared’s updated business model for commercial operations in the L-band MSS is that it proposes to provide a primary

^{82/} Letter from Jeffrey J. Carlisle, Executive Vice President, Regulatory Affairs & Public Policy, LightSquared, to Marlene H. Dortch, Secretary, FCC, SAT-MOD-20101118-00239, at 6-7 (filed Nov. 18, 2010).

^{83/} *Id.* at 1.

^{84/} *See id.* at 6-7.

^{85/} *Satellite Space Applications Accepted for Filing*, Public Notice, Report No. SAT-00738, at 1 (rel. Nov. 19, 2010).

^{86/} *See* Comments of the U.S. GPS Industry Council, IBFS File No. SAT-MOD-20101118-00239 (filed Dec. 2, 2010).

terrestrial wireless service with ancillary MSS, the exact opposite of the original premise of the service embodied in the current rules and its L-band ATC license.”^{87/}

- It cautions that “the major evolution now proposed by LightSquared” could have “potentially harmful consequences for the installed GPS user base.”^{88/}

December 13, 2010 – USGIC submits a letter to NTIA expressing concern over LightSquared’s new proposal for a stand-alone terrestrial network, including concerns regarding overload interference to GPS devices.

- USGIC states that “LightSquared’s application seeks to reinterpret its rules for integrated MSS ATC operation to effectively convert its existing MSS ATC authorization into a license to provide a high-capacity terrestrial network for a primarily cellular voice and data mobile wireless service in urban areas while conducting its MSS operation during certain times of the day and outside of areas where its proposed terrestrial service would operate. Thus, LightSquared proposes to provide a primarily terrestrial wireless service with ancillary MSS, the opposite of the original premise of the service embodied in the current rules and its L-band ATC license.”^{89/}
- It adds that “[t]his proposed change in the L-band MSS use introduces a different interference problem at the GPS receiver that will require adjustments in these mobile terrestrial operations to mitigate the detrimental operational interference effect it will otherwise create in adjacent broadcast RNSS bands – adjustments that necessarily go beyond the established out-of-band emission (‘OOBE’) limits in the existing MSS ATC authorization and that are not mitigated by lowering these limits.”^{90/}

December 20, 2010 – LightSquared submits a letter to the FCC stating that GPS interference is “highly unlikely.”

- LightSquared asserts that interference to GPS is “highly unlikely” under its proposal, but acknowledges that any interference caused to GPS would be problematic.^{91/}

^{87/} *Id.* at 3.

^{88/} *Id.* at 6.

^{89/} Letter from Charles L. Trimble, Chairman, USGIC, to Mr. Karl Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, IBFS File No. SAT-MOD-20101118-00239, at 1 (filed Dec. 13, 2010).

^{90/} *Id.* at 2.

^{91/} See Letter from Jeff Carlisle, Executive Vice President, Regulatory Affairs & Public Policy, LightSquared, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Dec. 20, 2010).

December 30, 2010 – USGIC submits a letter to FCC Chairman Genachowski requesting that LightSquared’s proposal be considered in a rulemaking proceeding in order to fully evaluate the GPS interference issues.

- USGIC states that “the physics and dynamics of [LightSquared’s] newly proposed terrestrial service would radically change and degrade the environment in which the adjacent GPS L1 signal resides. The ultimate effect would be a loss of GPS service.”^{92/}
- It adds that “if the Commission proceeds to authorize this modification of [LightSquared’s] ATC license without sufficient interference analysis and without ensuring necessary mitigation measures are taken to protect GPS, the resulting harm to GPS use could create a very serious setback for the Nation’s broadband agenda, the utility of GPS and the economic recovery of the United States.”^{93/}
- USGIC also submits numerous follow-up filings and participates in several *ex parte* meetings with the Commission to emphasize the gravity of the GPS interference concerns and the need for additional analysis.^{94/}

January 12, 2011 – NTIA submits a letter to Chairman Genachowski expressing its concerns with overload interference to GPS from LightSquared’s proposal and confirming its understanding that ATC operations were always intended to be limited in nature.

- NTIA cautions that LightSquared’s proposal “raises significant interference concerns that warrant full evaluation . . . to ensure that LightSquared services do not adversely impact Global Positioning System (GPS) and Global Navigation Satellite System (GNSS) receivers, maritime and aeronautical emergency communication systems, and Inmarsat receivers used by the Federal agencies.”^{95/}
- NTIA notes that it “recognized in 2002 that facilitating the introduction of ATC services in spectrum used for MSS could lead to an attendant increase in interference to GPS receivers, such as Enhanced-911 (E-911) capable handsets and consumer navigation and location devices. However, given the expected limited deployment of

^{92/} Letter from F. Michael Swiek, Executive Director, USGIC, to the Honorable Julius Genachowski, Chairman, FCC, IBFS File No. SAT-MOD-20101118-00239, at 1-2 (filed Dec. 30, 2010).

^{93/} *Id.* at 2-3.

^{94/} See, e.g., Letter from Stephen D. Baruch, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Jan. 7, 2011); Letter from Raul R. Rodriguez, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Jan. 7, 2011); Letter from Stephen D. Baruch, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Jan. 14, 2011); Letter from Stephen D. Baruch, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Jan. 19, 2011); Letter from Stephen D. Baruch, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Jan. 20, 2011).

^{95/} Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dep’t of Commerce, to Mr. Julius Genachowski, Chairman, FCC, IBFS File No. SAT-MOD-20101118-00239, at 1 (filed Jan. 12, 2011).

ATC base stations at that time under the FCC's orders granting ATC authority, NTIA believed that the FCC could address the potential interference to GPS receivers by establishing limits on emissions in the GPS frequency bands. The FCC specified limits on the radiated power of out-of-band emissions in the 1559-1610 MHz band from ATC base and mobile stations and also agreed to coordinate any ATC authority grant with NTIA, pursuant to the general notification process, to assure adequate protection of GPS services."^{96/}

- NTIA adds that LightSquared's proposal creates "a new and more challenging interference environment." It observed that "the Federal and non-Federal GPS users and GPS manufacturers thought this [overload interference] problem was manageable under the original MSS/ATC concept where there would be a limited number of terrestrial base stations transmitting at a low duty cycle to fill gaps in MSS coverage. . . [A]s the number of terrestrial base stations increases and/or the duty cycle of base stations transmissions increases to support the proposed LightSquared terrestrial network, NTIA is concerned that the likelihood of GPS and GNSS receiver in-band interference will also increase."^{97/}

January 12, 2011 – The Department of Defense writes to the FCC Chairman raising national security concerns with LightSquared's proposed operations.

- The Deputy Secretary of Defense, William J. Lynn, III, confirms that the Department of Defense ("DoD") has reviewed the pending order from the FCC's International Bureau granting LightSquared a conditional waiver to operate stand-alone operations and that there is "a potential for the LightSquared ATC network to interfere with the [DoD's] Global Positioning System, Inmarsat Terminals, and Aeronautical Mobile Telemetry operations."^{98/} He cautions that "there is a strong potential for interference to these critical National Security Systems", and therefore the DoD "strongly recommends deferral of final action on this ruling until the proper interference analysis and mitigation studies can be conducted"^{99/}

VI. THE FCC'S INTERNATIONAL BUREAU GRANTS LIGHTSQUARED A CONDITIONAL WAIVER; EXTENSIVE TESTING SHOWS THAT LIGHTSQUARED'S PROPOSED NETWORK WILL CAUSE MASSIVE OVERLOAD INTERFERENCE TO GPS DEVICES, WHICH CANNOT BE MITIGATED (2011 – PRESENT)

On January 26, 2011, the FCC's International Bureau waived the FCC's long standing integration requirement and permitted LightSquared to introduce ubiquitous, stand-alone terrestrial services in the L-Band, but expressly conditioned the waiver on resolution of GPS

^{96/} *Id.* at 2.

^{97/} *Id.* at 2-4.

^{98/} Letter from William J. Lynn, Deputy Secretary of Defense, Department of Defense, to Mr. Julius Genachowski, Chairman, FCC, at 1 (dated Jan. 12, 2011).

^{99/} *Id.*

overload interference concerns. The GPS community continued to be actively engaged in all relevant government proceedings, including by actively participating in the FCC-mandated working group formed to evaluate the potential for LightSquared's proposed operations to cause overload interference to GPS devices. The GPS community also continued to be an active participant in a number of proceedings addressing LightSquared's proposed network and GPS overload interference issues. It submitted written materials, engaged in follow-up meetings, and kept members of the Commission, NTIA, and Congress informed about its concerns.

The GPS industry's, the Federal government's, and other parties' concerns regarding the potential for LightSquared's proposed terrestrial network to cause overload interference to GPS devices were justified, as evidenced by the findings of the FCC-mandated technical working group, NTIA, and other parties, which all found that LightSquared's proposed terrestrial operations would cause devastating interference to a wide array of GPS devices. As a result of these findings, the FCC tentatively concluded that LightSquared's conditional authority should be vacated and its ATC authorization suspended indefinitely.

Detailed Timeline

January 26, 2011 – The FCC's International Bureau grants LightSquared a conditional waiver of the integrated service rule, permitting stand-alone terrestrial services in the L-Band for the first time subject to a finding that such operations will not cause harmful interference to GPS.

- The FCC's International Bureau's decision grants LightSquared a waiver of the ATC "integrated" service rule, thus permitting stand-alone terrestrial services in the L-Band for the first time, subject to a finding that LightSquared's proposed operations will not interfere with GPS.^{100/}
- A working group is established to fully study the potential for overload interference to GPS devices and to identify any measures necessary to prevent harmful interference to such devices.^{101/}
- The Bureau states that "Commission staff will work with NTIA, LightSquared, and the GPS community, including appropriate Federal agencies, to establish a working group to fully study the potential for overload interference to GPS devices and to identify any measures necessary to prevent harmful interference to GPS," and that "[t]he process will be complete once the Commission, after consultation with NTIA, concludes that the harmful interference concerns have been resolved and sends a letter to LightSquared stating that the process is complete."^{102/}

^{100/} See *LightSquared Subsidiary LLC Request for Modification of its Authority for an Ancillary Terrestrial Component*, Order and Authorization, 26 FCC Rcd 566 (2011).

^{101/} See *id.* ¶¶ 41-42.

^{102/} *Id.* ¶¶ 41, 43.

- The GPS industry, including Trimble, is enlisted to participate in the working group’s testing activities and in reviewing and approving its results.^{103/}
- The Department of Defense and the Department of Transportation express concerns about the working group process, particularly the lack of a formal role for Federal agencies.^{104/}
- USGIC continues to submit numerous follow-up filings and participate in *ex parte* meetings with the Commission to discuss GPS interference issues as well as the working group.^{105/}

January 21, 2011 – A LightSquared spokesman states that it “always knew” there would be interference to GPS.^{106/}

June 30, 2011 – USGIC files a petition for reconsideration seeking the FCC’s rescission of the two misstatements in the FCC’s April 6, 2011 2 GHz MSS decision.

- USGIC files a petition for reconsideration, showing that “there was no basis for the Commission to assert that extensive terrestrial operations have been anticipated in the L-band or to maintain that primary space-based services in the L-band must use receivers that discriminate against reception of signals from adjacent-band MSS ATC operations, which have no spectrum allocation and necessarily must operate on a non-protected, non-harmful-interference basis.” USGIC demonstrates that such statements are “inconsistent

^{103/} See Technical Working Group Report, Final Report, IBFS File No. SAT-MOD-20101118-00239, at 7-9 (filed June 30, 2011).

^{104/} See Letter from John D. Porcari, Deputy Secretary of Transportation, Dep’t of Transportation, and William J. Lynn III, Deputy Secretary of Defense, Dep’t of Defense, to Julius Genachowski, Chairman, FCC (March 25, 2011) (“DoD and DOT were not sufficiently included in the development of the LightSquared initial work plan and its key milestones. We are concerned with this lack of inclusiveness regarding input from federal stakeholders. . . . DoD and DOT strongly advise that a comprehensive study of all the potential interference to GPS is needed. The new LightSquared business plan and the new FCC rules significantly expand the terrestrial transmission environment, increasing the potential for interference to GPS receivers.”).

^{105/} See, e.g., Letter from Stephen D. Baruch, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Feb. 7, 2011); Letter from Stephen D. Baruch, Lerman Senter PLLC, Counsel for the USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed March 15, 2011); see also Reply to Opposition of the U.S. GPS Industry Council, *et al*, IBFS File No. SAT-MOD-20101118-00239 (filed March 29, 2011).

^{106/} Graham Warwick, *LightSquared Tests Confirm GPS Jamming*, AVIATION WEEK (June 13, 2011) (quoting LightSquared’s Jeffrey Carlisle); see also Letter from Sanjiv Ahuja, Chairman and CEO, LightSquared, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 (filed Jan. 21, 2011) (stating that LightSquared “was cognizant of this [interference] issue when [it] made the build-out commitments that served as the basis for the Commission’s own requirements in its March 2010 Order”).

not only with all prior FCC policy statements concerning these matters, but with relevant FCC rules.”^{107/}

June 30, 2011 – The FCC’s International Bureau announces the release of, and seeks comment on, the final report of the FCC-mandated technical working group, which found that LightSquared’s proposed stand-alone terrestrial network has the potential to create massive overload interference to a wide range of GPS devices.

- The FCC’s International Bureau seeks comment on the findings of the Technical Working Group (“TWG”), which examined the GPS overload interference issue and “identified significant technical issues related to potential LightSquared operations in the upper portion of the L-Band, which is most proximate to the band used by GPS,” including “potentially significant interference between LightSquared operations in the upper portion of the band and various GPS receivers.” The tests also “identified some interference issues in the lower 10 MHz portion of the band.”^{108/}
- Members of the GPS community submit numerous comments and filings with the Commission expressing support for the TWG’s conclusions.^{109/}
- Upon closing of the comment period, Trimble and the GPS industry continue to follow up and actively engage with the Commission and other interested parties, including members of Congress, regarding their concerns.^{110/}

^{107/} Petition for Reconsideration of the U.S. GPS Industry Council, ET Docket No. 10-142, at 10 (filed June 30, 2011).

^{108/} *Comment Deadlines Established Regarding the LightSquared Technical Working Group Report*, Public Notice, 26 FCC Rcd 9284 (2011); Technical Working Group Report, Final Report, IBFS File No. SAT-MOD-20101118-00239 (filed June 30, 2011).

^{109/} See, e.g., Comments of Trimble Navigation Limited, IB Docket No. 11-109 (filed Aug. 1, 2011); Comments of the U.S. GPS Industry Council, IB Docket No. 11-109 (filed Aug. 1, 2011); Comments of the Coalition to Save Our GPS, IB Docket No. 11-109 (filed Aug. 1, 2011); Reply Comments of Trimble Navigation Limited, IB Docket No. 11-109 (filed Aug. 15, 2011); Reply Comments of the U.S. GPS Industry Council, IB Docket No. 11-109 (filed Aug. 15, 2011); Reply Comments of the Coalition to Save Our GPS, IB Docket No. 11-109 (filed Aug. 15, 2011).

^{110/} See, e.g., Letter from Russell H. Fox, Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Counsel to Trimble, and Anne Swanson, Dow Lohnes PLLC, Counsel to Garmin International, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109 (filed Sept. 15, 2011); Letter from James A. Kirkland, Vice President and General Counsel, Trimble, to the Honorable Michael Turner, Chairman, Strategic Forces Subcommittee of the House Armed Services Committee, and the Honorable Loretta Sanchez, Ranking Member, Strategic Forces Subcommittee of the House Armed Services Committee (Oct. 6, 2011), *attached to* Letter from Russell H. Fox, Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Counsel to Trimble, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109 (filed Oct. 7, 2011); Letter from F. Michael Swiek, Executive Director, USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 and IB Docket No. 11-109 (filed Jan. 12, 2012); Letter from F. Michael Swiek, Executive Director, USGIC, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-MOD-20101118-00239 and IB Docket No. 11-109 (filed Feb. 16, 2012).

September 13, 2011 – NTIA submits a letter to the Department of Defense and the Department of Transportation expressing its concerns with overload interference to various GPS devices and requesting additional testing.

- NTIA reports that testing has confirmed that a variety of GPS receivers will receive harmful interference from LightSquared’s proposed operations. For instance, “[a]ll parties, including LightSquared, have agreed that LightSquared’s operations in the lower 10 MHz signal will cause unacceptable interference to the high-precision receivers tested by the TWG.”^{111/}
- NTIA also requests that “the Executive Steering Group of the interagency National Executive Committee for Space-Based Positioning, Navigation and Timing (ExCom) work with LightSquared to develop as expeditiously as possible a joint testing plan to validate data on the performance of cellular and personal/general navigation Global Positioning System (GPS) receivers. . . .”^{112/}

February 14, 2012 – NTIA submits a letter to the FCC finding that LightSquared’s proposed stand-alone terrestrial network will cause overload interference to GPS devices that cannot be mitigated at this time.

- Reporting on additional testing, NTIA submits a letter to the FCC finding that LightSquared’s proposed stand-alone terrestrial operations will cause harmful interference to GPS and concluding that at this time “there are no mitigation strategies that both solve the interference issues and provide LightSquared with an adequate commercial network deployment.”^{113/}

February 15, 2012 – The FCC’s International Bureau tentatively concludes that the conditional waiver granted to LightSquared should be vacated and LightSquared’s ATC authority revoked in light of the significant concerns regarding receiver overload to GPS devices created by LightSquared’s proposed terrestrial operations.

- The FCC’s International Bureau finds that “it is highly unlikely that LightSquared will, in any reasonable period of time, be able to satisfy the requirements” of the conditional waiver. As a result, it seeks comment on its proposal to vacate LightSquared’s conditional waiver of the integrated service rule and suspend indefinitely LightSquared’s ATC authorization.^{114/}

^{111/} Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dep’t of Commerce, to Julius Genachowski, Chairman, FCC, IBFS File No. SAT-MOD-20101118-00239, at Attachment, at 2-3 (dated Sep. 13, 2011).

^{112/} *Id.* at 1.

^{113/} Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dep’t of Commerce, to Julius Genachowski, Chairman, FCC, at 8 (dated Feb. 14, 2012).

^{114/} *See International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver*, Public Notice, 27 FCC Rcd 1596 (2012).

- In light of NTIA’s findings and in response to the Commission’s request for comment on the same, the GPS industry states that LightSquared’s conditional authority should be revoked because it has failed to demonstrate that it will not cause harmful interference to GPS receivers.^{115/}

March 21, 2012 – The Commission takes action to allow terrestrial-only services in the 2 GHz Band.

- The Commission adds a primary terrestrial allocation in the 2 GHz band and initiates a 2 GHz rulemaking proceeding to “carry out [the] recommendation in the *National Broadband Plan* that the Commission enable the provision of stand-alone terrestrial services in this spectrum.”^{116/}
- The Commission also specifically notes that it has yet to take the actions necessary to allow stand-alone terrestrial operations in the L-Band, observing that it intends to address the ATC rules for L-Band MSS “in one or more separate proceedings at a later date.”^{117/}
- The Commission further confirms the limited nature of the ATC authority established in 2003, stating that it was designed to allow “authorized MSS operators to augment their satellite services with terrestrial facilities” and that in order to “ensure that ATC would be ancillary to the provision of MSS, the Commission determined that ATC authority would be limited to MSS operators who met specific ‘gating’ criteria.”^{118/} One of the gating criteria established was the integrated service rule, which required any ATC operations to be integrated with the underlying satellite service and prohibited terrestrial-only services.
- USGIC supports the introduction of terrestrial services in the 2 GHz band “with the understanding that the Commission will also act in a manner that continues to protect the integrity and stability of existing services.”^{119/} It also notes that given the technical issues specific to this band, “the Commission is correct in limiting the scope of the current proceeding to the 2 GHz MSS bands.”^{120/} USGIC explains that “unlike other bands allocated for MSS use, terrestrial operations in the 2 GHz band do not raise issues of ‘overload,’ or desensitization, interference affecting RNSS receivers.”^{121/}

^{115/} See, e.g., Comments of the Coalition to Save Our GPS, IB Docket No. 11-109 and ET Docket No. 10-142, File No. SAT-MOD-20101118-00239 (filed March 16, 2012); Comments of the U.S. GPS Industry Council, IB Docket No. 11-109, File No. SAT-MOD-20101118-00239 (filed March 16, 2012); Reply Comments of the Coalition to Save Our GPS, IB Docket No. 11-109 and ET Docket No. 10-142, File No. SAT-MOD-20101118-00239 (filed March 30, 2012).

^{116/} *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands, et al.*, Notice of Proposed Rulemaking and Notice of Inquiry, 27 FCC Rcd 3561, ¶¶ 1, 13-14 (2012).

^{117/} *Id.* ¶ 136; see also *id.* ¶ 2.

^{118/} *Id.* ¶ 5.

^{119/} Comments of the U.S. GPS Industry Council, WT Docket No. 12-70, ET Docket No. 10-142, and WT Docket No. 04-356, at 1 (filed May 17, 2012).

^{120/} *Id.* at 3.

^{121/} Reply Comments of the U.S. GPS Industry Council, WT Docket No. 12-70, ET Docket No. 10-142, and WT Docket No. 04-356, at 4 (filed June 1, 2012).